

Activity Sheet 1: Vocabulary and Symbols

Instructor's Reference

Define each of the following vocabulary terms.

Term	Definition
Conditional Statement	<u>Statement</u> that can be <u>written</u> in “if..., then” form
Hypothesis	Part of a <u>conditional</u> statement that <u>follows</u> “if”
Conclusion	Part of a conditional <u>statement</u> that follows “then”
Negation	<u>Denial</u> of a <u>statement</u> formed by adding or removing the word <u>not</u> from a statement
Negate	To add or remove the word <u>not</u> from a statement to change its truth value from true to <u>false</u> or from false to <u>true</u>
Converse	<u>Statement</u> formed from a <u>conditional</u> statement by <u>switching</u> the <u>hypothesis</u> and <u>conclusion</u>
Inverse	<u>Statement</u> formed from a <u>conditional</u> statement by <u>negating</u> the <u>hypothesis</u> and <u>conclusion</u>
Contrapositive	<u>Statement</u> formed from a <u>conditional</u> statement by <u>switching</u> AND <u>negating</u> the <u>hypothesis</u> and <u>conclusion</u>
Biconditional	Statement combining a <u>conditional</u> statement and its <u>converse</u> , using the phrase “if and <u>only</u> if”

Fill in the meaning of each of the following symbols.

$p, q, r, s, t,$ etc.	Meaning: Symbols used to represent statements such as hypotheses and conclusions		
\rightarrow	Meaning: if..., then (implies)	\vee	Meaning: or
\sim	Meaning: not	\therefore	Meaning: therefore
\wedge	Meaning: and	\leftrightarrow	Meaning: if and only if (iff)

Activity Sheet 2: Logic and Conditional Statements

Name _____ Date _____

Use the following conditional statement to answer the problems: "If I win, then you don't lose."

1. Write the hypothesis. I win
2. Write the conclusion. you don't lose
3. Negate the hypothesis. I will not win
4. Negate the conclusion. you do lose
5. Write the converse. if you don't lose, then I win
6. Write the inverse. if I don't win, then you lose
7. Write the contrapositive. if you lose, then I don't win
8. Write the biconditional. I win if and only if you don't lose

Use the following conditional statement to answer the problems: "If elephants fly, then fish don't swim." Each answer should be a complete sentence, not symbols.

1. p is the hypothesis. Write p . Elephants fly
2. q is the conclusion. Write q . Fish don't swim
3. $\sim p$ means "the negation of p ." Write $\sim p$. Elephants don't fly
4. $\sim q$ means "the negation of q ." Write $\sim q$. Fish swim
5. (converse) $q \rightarrow p$ means " q implies p " or "If q , then p ." Write $q \rightarrow p$.
if fish don't swim then elephants fly
6. (inverse) $\sim p \rightarrow \sim q$ means "Not p implies not q " or "If not p , then not q ." Write $\sim p \rightarrow \sim q$.
if elephants don't fly, then fish swim
7. (contrapositive) $\sim q \rightarrow \sim p$ means "Not q implies not p " or "If not q , then not p ." Write $\sim q \rightarrow \sim p$. if fish swim then elephants don't fly
8. $p \wedge q$ means " p and q ." Write $p \wedge q$. Elephants fly and fish don't swim
9. $p \vee q$ means " p or q ." Write $p \vee q$. Elephants fly or fish don't swim
10. $\therefore p$ means "therefore p ." Write $\therefore p$. \therefore Elephants fly
11. $p \leftrightarrow q$ means " p if and only if q ." Write $p \leftrightarrow q$. Elephants fly if and only if fish don't swim